

RESEARCH AND GRADUATE STUDIES

IN THE DEPARTMENT OF

Animal Sciences

UNIVERSITY OF KENTUCKY


Sustainability, environmental concerns, and food safety have profound impacts on animal agriculture today, and these issues represent challenges to the research groups within the Department of Animal Sciences. Through the study of molecular mechanisms, whole animal metabolism, and animal-derived food processing and handling, knowledge and technologies are being developed which contribute to the advancement of animal biology and production systems.

Our research mission is to:

- improve the production and health of animals and the utilization of animal-derived products;
- provide students with training as part of a nationally recognized research program; and
- contribute scientific breakthroughs that optimize the economic viability and sustainability of animal agriculture.

Animal Science disciplines include ruminant, nonruminant, and equine nutrition; nutritional and anaerobic microbiology; physiology; genetics and animal breeding; and food science. This diversity contributes to multi-disciplinary approaches which benefit animal agriculture.

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Forages are an important part of ruminant animal production, and increasing the efficiency of forage utilization is an important part of ruminant nutrition research within the Department. We also have active programs in swine and poultry nutrition that investigate a variety of factors which influence the productive performance of these species.

■ Ruminant Nutrition

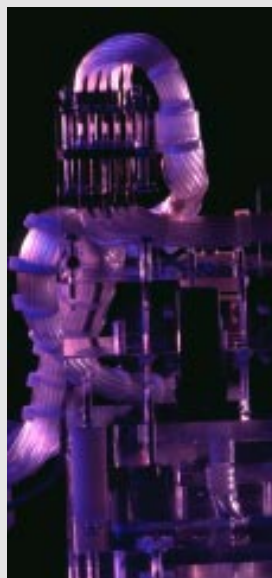
Ruminants have a unique place in animal agriculture because they efficiently digest fibrous plant materials. Studies range from cellular limitations of nutrient assimilation to forage use by grazing animals. Research includes:

- regulation of nutrient digestion and absorption;
- optimizing forage availability and utilization;
- nutrient requirements and management;
- protein, vitamin, and mineral nutrition; and
- use of alternative feeds.

■ Nonruminant Nutrition

Research in nonruminant nutrition involves swine and poultry. Discoveries from both basic and applied studies are integrated to maximize the efficiency of meat and egg production and optimize reproductive performance. Research includes:

- bioavailability of nutrients;
- interrelations of nutrients with genetics and environmental factors;
- efficacy of growth and carcass modifiers; and
- nutritional properties of feed ingredients.



■ Equine Nutrition

Horses are an important part of the agricultural economy in Kentucky as well as the rest of the nation, and the University of Kentucky has long been a premier institution for equine research. Outstanding research facilities include a large horse herd, ample individual housing, analytical laboratory, round pen and treadmill. Horse research focuses on nutrition, including:

- hormonal and metabolic responses to exercise;
- nutrient requirements during growth, reproduction, and exercise; and
- dietary management procedures.

■ Nutritional/Anaerobic Microbiology

Microorganisms play key roles in many agricultural and animal production systems. The microbiology program emphasizes the use of molecular and biochemical tools for studying and manipulating microbial activities of agricultural importance. Research includes:

- basic microbial physiology;
- ecological relationships between microorganisms and host animals; and
- enhancing animal nutrition, health, and production.

We have a well-established program on equine nutrition which takes advantage of the unique opportunities present within the state. A strong microbiology group focuses on agriculturally important anaerobic bacteria, particularly those inhabiting the gastrointestinal tracts of animals.





New research farm facilities for both ruminant and nonruminant species enhance our ability to conduct in-depth studies involving forage utilization, environmental impact, and applied technologies.

■ Physiology

The reproductive physiology group includes faculty who conduct basic and applied research with beef cattle, dairy cattle, swine, and sheep. Research ranges from field trials with cooperating commercial herds to *in vitro* studies at the cellular and molecular levels. Lactational physiology focuses on prevention and control of mastitis and on bovine immune function. Research includes:

- regulation of puberty onset;
- endocrine control of uterine function;
- enhancement of sperm fertility;
- nutritional and environmental factors influencing disease resistance in cattle; and
- studies on mastitis prevention and control.



■ Genetics and Breeding

Researchers evaluate various beef cattle genetic types when managed on endophytic-tall fescue. Also, emphasis is directed towards evaluating the impact of weaning production on subsequent reproductive performance of the cow herd.



■ Food Science

The Food Science program integrates a strong basic research program with applied studies in areas related to foods derived from animals and other important agricultural products.

Active research programs have been developed in:

- **Dairy technology**—cheese yield and medium development; prevention of culture agglutination and inhibition of bacteriophage proliferation.
- **Food chemistry**—identification and control of lipid-derived flavor compounds; lipid-protein interactions.
- **Food microbiology**—identification of methods for extending the shelf-life of foods.
- **Food safety**—identification of methods for preventing foodborne illness.
- **Meat biochemistry**—postmortem protein changes and meat tenderness; functional performance of oxidized proteins.
- **Meat processing**—identification of methods to improve the value of low-quality raw materials; development of low-fat meats.

Food Science research is essential to the efficient utilization of valuable agricultural products and adding value to low-quality raw materials. The number of jobs in the field has historically exceeded the number of Food Science graduates.





Graduate Study

The Department of Animal Sciences offers numerous opportunities for advanced study. Graduate students work closely with faculty who are nationally and internationally recognized as experts in their fields. Research projects span the spectrum from basic studies of molecular biology to applied aspects of optimizing nutritional strategies. There are also opportunities to work collaboratively with extension faculty in the department, other research scientists in the University, other academic institutions, and industry.

The University of Kentucky is classified as a Research Category 1 university by the Carnegie Foundation and is in the top tier of public research institutions in the country. The Department has modern research and farm facilities, and many service facilities are available in the College and University.

Degree Programs

The Department offers both M.S. and Ph.D. degrees in Animal Sciences with specializations in:

- Ruminant Nutrition
- Nonruminant Nutrition
- Nutritional/Anaerobic Microbiology
- Reproductive or Lactational Physiology
- Genetics and Animal Breeding
- Food Science

For more information about graduate studies in the Department of Animal Sciences contact us at:

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Visit our homepages at:

<http://www.uky.edu/Agriculture/AnimalSciences/ukdas.html>

<http://www.uky.edu/Agriculture/AnimalSciences/food/food.html>



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